WHAT IS CLAIMED IS:

1. A semiconductor laser device comprising:

an active layer;

a first cladding layer of a first conduction type provided on said active layer;

a current blocking layer of a second conduction type provided on said first cladding layer except a current injection region;

a low carrier concentration layer provided on the side of said current blocking layer between said first cladding layer and said current blocking layer and having a lower carrier concentration than said current blocking layer; and

a depletion enhancement layer provided on the side of said first cladding layer between said first cladding layer and said current blocking layer for inhibiting storage of carriers in said low carrier concentration layer.

2. The semiconductor laser device according to claim 1, wherein

the band gaps of said first cladding layer, said depletion enhancement layer and said low carrier concentration layer are reduced in this order.

3. The semiconductor laser device according to claim 1,

wherein

said first cladding layer has a flat portion formed on said active layer and a ridge portion formed on said flat portion in said current injection region,

said depletion enhancement layer is formed on said flat portion located on both sides of said ridge portion and on the side surfaces of said ridge portion, and

said low carrier concentration layer and said current blocking layer are successively formed on said depletion enhancement layer.

4. The semiconductor laser device according to claim 3, wherein

the thickness of said depletion enhancement layer is at least 10 nm.

5. The semiconductor laser device according to claim 4, wherein

the thickness of said depletion enhancement layer is at least 15 nm.

6. The semiconductor laser device according to claim 1, further comprising a ridge-shaped second cladding layer of a first conduction type provided on said depletion enhancement layer in said current injection region, wherein

said depletion enhancement layer is formed on said first cladding layer, and

said lower carrier concentration layer and said current blocking layer are successively formed on said depletion enhancement layer located on both sides of said second cladding layer and on the side surfaces of said second cladding layer.

7. The semiconductor laser device according to claim 1, wherein

said depletion enhancement layer, said low carrier concentration layer and said current blocking layer are successively formed on said first cladding layer except said current injection region,

said semiconductor laser device further comprising a second cladding layer of a first conduction type provided to fill up a space enclosed with the side surfaces of said depletion enhancement layer, said low carrier concentration layer and said current blocking layer and the upper surface of said first cladding layer in said current injection region.

8. The semiconductor laser device according to claim 6, wherein

the thickness of said depletion enhancement layer is at least 15 nm.

9. The semiconductor laser device according to claim 8, wherein

the thickness of said depletion enhancement layer is at least 20 nm.

10. The semiconductor laser device according to claim 7, wherein

the thickness of said depletion enhancement layer is at least 15 nm.

11. The semiconductor laser device according to claim 10, wherein

the thickness of said depletion enhancement layer is at least 20 nm.

12. The semiconductor laser device according to claim 1, wherein

said depletion enhancement layer has a single-layer structure or a superlattice structure.

13. The semiconductor laser device according to claim 1, wherein

said active layer includes a layer made of $(Al_{x1}Ga_{1-x1})_{y1}In_{1-y1}P$,

said depletion enhancement layer is made of $(Al_{x2}Ga_{1-}$

$_{x2})_{y2}In_{1-y2}P$ or $Al_{x2}Ga_{1-x2}As$,

said low carrier concentration layer is made of $(Al_{x3}Ga_{1-x3})_{y3}In_{1-y3}P$ or $Al_{x3}Ga_{1-x3}As$,

said current blocking layer is made of $(Al_{x4}Ga_{1-x4})_{y4}In_{1-y4}P$ or $Al_{x4}Ga_{1-x4}As$, and

said x1, said x2, said x3, said x4, said y1, said y2, said y3 and said y4 are at least zero and not more than 1 respectively.

14. The semiconductor laser device according to claim 1, wherein

said active layer includes a layer made of $Al_{x1}Ga_{1-x1}As$,

said depletion enhancement layer is made of $Al_{x2}Ga_{1-x2}As$,

said low carrier concentration layer is made of $Al_{x3}Ga_{1-x3}As$,

said current blocking layer is made of $Al_{x4}Ga_{1-x4}As$, and

said x1, said x2, said x3 and said x4 are at least zero and not more than 1 respectively.

15. The semiconductor laser device according to claim 1, wherein

said active layer is made of $In_{x1}Ga_{1-x1}N$,

said depletion enhancement layer is made of $Al_{x2}Ga_{1-x2}N$,

said low carrier concentration layer is made of $Al_{x3}Ga_{1-x3}N$,

said current blocking layer is made of $Al_{x4}Ga_{1-x4}N$, and

said x1, said x2, said x3 and said x4 are at least zero and not more than 1 respectively.

16. The semiconductor laser device according to claim 1, wherein

said active layer includes a layer made of $(Al_{x1}Ga_{1-x1})_{y1}In_{1-y1}P$,

said depletion enhancement layer is made of $(Al_{x2}Ga_{1-x2})_{y2}In_{1-y2}P$,

said low carrier concentration layer is made of $Al_{x3}Ga_{1-x3}As$,

said current blocking layer is made of $Al_{x4}Ga_{1-x4}As$,

said x1, said x2, said x3, said x4, said y1 and said y2 are at least zero and not more than 1 respectively, and

said first conduction type is the p type, and said second conduction type is the n type.

17. A semiconductor laser device comprising:

an active layer;

a first cladding layer of a first conduction type provided on said active layer;

a first current blocking layer having a low carrier concentration provided on said first cladding layer except a current injection region; and

a depletion enhancement layer formed between said first cladding layer and said first current blocking layer for inhibiting storage of carriers in said first current blocking layer, wherein

said depletion enhancement layer has an energy level in band gap supplying second conduction type carriers to compensate for first conduction type carriers supplied from said first cladding layer due to a modulation doping effect.

18. The semiconductor laser device according to claim 17, wherein

said first current blocking layer has a narrower band gap than said first cladding layer.

19. The semiconductor laser device according to claim 17, wherein

said energy level in band gap has such density that substantially all said band-to-band levels ionize under a condition applying no bias voltage.

20. The semiconductor laser device according to claim 17, wherein

said energy level in band gap is formed by doping with a second conduction type impurity.

21. The semiconductor laser device according to claim 17, wherein

the material of said depletion enhancement layer is the same as the material of said first current blocking layer.

22. The semiconductor laser device according to claim 17, wherein

said first cladding layer has a larger band gap than said depletion enhancement layer,

said semiconductor laser device further comprising an intermediate band gap layer provided between said first cladding layer and said depletion enhancement layer and having a band gap smaller than the band gap of said first cladding layer and larger than the band gap of said depletion enhancement layer.

23. The semiconductor laser device according to claim 17, wherein

said depletion enhancement layer has a band gap smaller than the band gap of said first cladding layer and larger than the band gap of said first current blocking layer.

24. The semiconductor laser device according to claim 17, wherein

said first cladding layer has a flat portion formed on

said active layer and a ridge portion formed on said flat portion in said current injection region,

said depletion enhancement layer is formed on said flat portion located on both sides of said ridge portion and on the side surfaces of said ridge portion, and

said first current blocking layer is formed on said depletion enhancement layer.

25. The semiconductor laser device according to claim 17, wherein

said depletion enhancement layer and said first current blocking layer are successively formed on said first cladding layer except said current injection region,

said semiconductor laser device further comprising a second cladding layer of a first conduction type provided to fill up a space enclosed with the side surfaces of said depletion enhancement layer and said first current blocking layer and the upper surface of said first cladding layer in said current injection region.

26. The semiconductor laser device according to claim 17, wherein

said depletion enhancement layer is formed on a region excluding said current injection region.

27. The semiconductor laser device according to claim 17, further comprising a second current blocking layer of a second conduction type provided on said first current blocking layer.

28. A semiconductor laser device comprising:

an active layer;

a first cladding layer of a first conduction type provided on said active layer;

a first current blocking layer having a low carrier concentration provided on said first cladding layer except a current injection region; and

a depletion enhancement layer formed between said first cladding layer and said first current blocking layer for inhibiting storage of carriers in said first current blocking layer.

29. The semiconductor laser device according to claim 28, wherein

said first current blocking layer having a low carrier concentration has a narrower band gap than said first cladding layer.

30. The semiconductor laser device according to claim 28, wherein

the band gaps of said first cladding layer, said depletion enhancement layer and said first current blocking layer having a low carrier concentration are reduced in this order.

31. The semiconductor laser device according to claim 28, wherein

said first cladding layer has a flat portion formed on said active layer and a ridge portion formed on said flat portion in said current injection region,

said depletion enhancement layer is formed on said flat portion located on both sides of said ridge portion and on the side surfaces of said ridge portion, and

said first current blocking layer having a low carrier concentration is formed on said depletion enhancement layer.

32. The semiconductor laser device according to claim 28, further comprising a ridge-shaped second cladding layer of a first conduction type provided on said depletion enhancement layer in said current injection region, wherein

said depletion enhancement layer is formed on said first cladding layer, and

said first current blocking layer having a lower carrier concentration is formed on said depletion enhancement layer located on both sides of said second cladding layer and on the side surfaces of said second cladding layer.

33. The semiconductor laser device according to claim 28, wherein

said depletion enhancement layer and said first current blocking layer having a low carrier concentration are successively formed on said first cladding layer except said current injection region,

said semiconductor laser device further comprising a second cladding layer of a first conduction type provided to fill up a space enclosed with the side surfaces of said depletion enhancement layer and said first current blocking layer having a low carrier concentration and the upper surface of said first cladding layer in said current injection region.